

Best Management Practices for Channel Catfish Culture

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In 2000, the Iowa Department of Natural Resources (IDNR) constructed 10 1-acre and six 1/10-acre plastic-lined ponds at the Rathbun Hatchery/Research Facility for fish production and research purposes; up to this time, plastic-lined ponds have not been used by IDNR. Since early 2000, channel catfish have been stocked into these ponds in June with the goal to produce 8-inch fingerlings that are then stocked into public waters. During the first 4 years of operation, channel catfish culture survival and growth have been highly variable within individual culture season, causes being principally poor water quality conditions.

In 2003, a new study was started that investigated the role of stocking density upon fish survival, fish production and water quality. Two treatments were used: 30,000 and 45,000 fish per acre. Survival for all ponds was approximately 86% but fish in neither treatment reached the desired mean 8-inch size during the 120-day culture period. While the survival was substantially higher and less variable compared to the previous three production periods, this success did require substantial pond management, e.g., pond flushing and feed limitation. In addition, most of the ponds did have excessive phosphorus and ammonia as well as elevated pH levels. We related these to the use of fish food high in protein and phosphorus as well as high fish stocking densities.

In 2004 and continued into 2005, our research strategy was to address concerns related to water quality and fish production. The outcome will be a management plan for production of channel catfish in these ponds. Based on the initial research findings, it appears that the plastic-lined ponds at this hatchery should be stocked at 15,000 - 30,000 fish/acre whereby the desired 8-inch fish are produced during the first fall. Without sediment to adsorb over abundances of phosphorus added from feed, excessive phytoplankton growth can produce depressed oxygen levels and increased pH levels resulting in possible stress conditions for the fish cultured in plastic-lined ponds.

In addition to the stocking levels being addressed, this project is also investigating the role of feed protein levels in water quality and fish production. On the onset of the 2004 culture season we expected that ponds receiving the 28% protein diets would have lower concentrations of total phosphorus compared to the ponds given the 36% protein diet; however the exact opposite happened. Feed analyses revealed that the 28% protein diet actually contained more phosphorus than the 36% protein diet. Using diets from the same manufacturer may alleviate this problem.

The 2005 culture season will be a repeat of the 2004 culture season. The unseasonably low temperatures in 2004 impacted fish growth to the point few fish reached the desirable size in fall. Repeating the full experiment in 2005 will be valuable in address the roles of fish stocking and feed components in fish production at this hatchery.